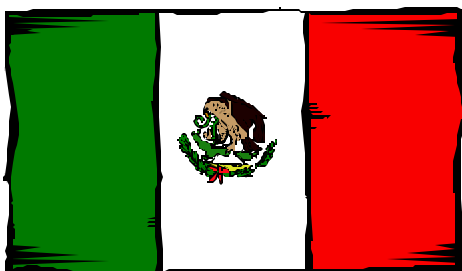


**Forest Health Protection Aerial Survey Training  
For  
Mexico's Comision National Forestal (CONAFOR),  
Sanidad Forestal  
2004 – 2005**



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**November, 2003, Guadalajara, Mexico**

Jaime Villa Castillo, Gerente de Sanidad Forestal, CONAFOR made a request for aerial survey sketchmapping training to Robert Mangold, Director, Forest Health Protection (FHP), USDA Forest Service at the Western Forest Insect Work Conference. Tim McConnell, FHP Aviation Safety Manager was given the assignment of providing the training to Sanidad Forestal employees.

The key Sanidad Forestal employees were:

Carlos Alberto Magallon Morineau – Department Chief, Guadalajara

David Antonio Quiroz – GIS & Remote Sensing Specialist, Guadalajara

The key FHP employees were:

Tim McConnell – FHP Aviation Safety Manager, WO

Erik Johnson - FHP Aerial Survey Program Manager and Unit Aviation Officer, R-2

**August 15-21, 2004, Steamboat, Colorado**

Carlos Magallon and David Quiroz came to the Rocky Mountain Region to participate in operational aerial survey work to get on the job training. Erik Johnson provided the opportunity in Steamboat, Colorado on the Routt National Forest. With two fixed-wing airplanes available Tim McConnell conducted contour flight pattern aerial surveys, while Erik Johnson conducted grid pattern aerial surveys providing Carlos and David with operational experience with both flight patterns during the week. David was also exposed to FHP's digital sketchmap system (DASM). Northeast of Steamboat provided an excellent opportunity for the trainees to observe forest damage from spruce beetle, mountain pine beetle in lodgepole, severe blowdown (1997) and recent wild fire. In addition to operational aerial survey experience, David and Carlos sat through aerial survey training by Tim McConnell using Power Point presentations and went on a field trip to view forest damage and do tree species identification with Brian Howell, FHP Lakewood Service Center. At the end of the week David and Carlos were introduced to Jose Negrón, Rocky Mountain Research Station Entomologist in Fort Collins, Colorado.

**September 27-October 1, 2004, Ensenada, Baja, Mexico**

Tim McConnell flew to San Diego, California where he was met by Carlos Magallon and Mario Mendoza, Baja Sanidad Forestal specialist and drove to Ensenada, Baja, Mexico. The plan was for Tim to conduct aerial survey grid

flights over the Parque Nacional Constitución de 1857 and continue to train Carlos and introduce Mario to aerial surveys.

The flights were done a couple weeks after FHP entomologists Joel McMillin, Tom Eager, Brytten Steed, Sheri Smith and Dan Cluck provided training in ground-based methods of plot data collection in the same area to Sanidad Forestal employees.

Of primary interest was to map Jeffery pine beetle, pinyon ips and recent fire damage. Severe drought had lowered the water table in this high plateau park to the point that Laguna Hansen was completely dry and the surrounding conifers were extremely susceptible to bark beetle attacks.



Figure 1. Carlos and Mario



Figure 2. Aerial Survey in the Park

The survey was completed over a three day period. Ground check follow-up was done on the last full day demonstrating that aerial sketchmap surveys are a viable technique that can be used in Mexico. The one challenge for sketchmapping that week was that the airplane used had dark tinted windows creating a monochromatic effect that greatly reduced the visibility of the color signature of the dead pines. The aircraft used was a Cessna 182 and the pilot was skilled and responsive to our survey requests.



Figure 3. Ensenada airport and plane



Figure 4. Burned Jeffrey pine

## April 27 – May 2, 2005, Guadalajara and Oaxaca, Mexico

At the request of David Quiroz, Erik Johnson flew to Guadalajara, Forestal Sanidad national headquarters, to help him set-up his digital sketchmap system and to further expose him to the FHP DASM Hammer Head system prior to operational aerial survey and training the following week in Oaxaca.



Figure 5. CONAFOR and FHP sketchmappers in Oaxaca

On April 25, 2005 Tim McConnell flew to Oaxaca, Mexico to meet up with David, Erik, Carlos Magallon, Jamie Villa and approximately 10 regional aerial survey trainees. The plan was to conduct operational grid pattern aerial surveys while training regional forest health specialist and training David on the use of the digital sketchmap system.

The first day of the training session was classroom "How to do Aerial Survey", plus map preparation and mission planning. Aerial surveys were conducted daily except for one day when the group drove to the field to do ground checking. Both Tim and Erik participated in the sketchmap training. The aircraft used was a Cessna 206 turbo and two excellent pilots flew us during the week. The aircraft was contracted from the Alas de Socorro, a Christian relief organization based in Oaxaca.

Pine mortality due to southern pine beetle and Mexican pine beetle and recent fires were sketchmapped. Trainees compared their sketchmaps with their Forest Service instructor after each flight. Post processing of the maps was done daily.



Figure 6. Pedro, Tim, Gerson and Fernando before flight

The ground checking field trip occurred northwest of Oaxaca in mountainous terrain partially covered in pine forests. Students brought their maps along to compare with what they saw on the ground the day after flying the same area.



Figure 7. Ground check navigation



Figure 8. Students in the field

Meteorological conditions were extremely hazy due to field burning and an ongoing high pressure over the area. Each day there were thunder storm build-ups in the afternoon. The survey was flown late in the dry season that brought a challenge of another tree signature; latent leaf abscission in oak species. This was usually at lower elevations than the pine type, but occasionally mixed.





Figure 9. Road to polygons



Figure 10. Typical vegetation

After work hours the group was busy with a variety of activities, including: a visit to the oldest tree in Mexico - the Tule tree; a private tour of the newly built botanical garden in Oaxaca; a visit to the ancient ruins of Monte Alban; and of course sampling the world famous cuisine of Oaxaca.

Currently Sanidad Forestal is in the process of procuring GeoLink PowerMap and Mapping Companion software for digital collection of aerial survey data.

One interesting finding from the training session is that three of the students from the Oaxaca session also attended the FHP aerial survey training in Metepec, Mexico, March 1998.

The training session provided the experience, knowledge and confidence for the students to begin to plan their respective aerial surveys in their own regions. Since the Oaxaca session aerial surveys have been conducted in the State of Jalisco and Oaxaca. Pinyon pine surveys are planned to be flown in the States of Chihuahua and Sonora. With Carlos Magallon as the head of aerial survey for Forestal Sanidad, their organization is off to an excellent start in conducting regular aerial surveys across the forests of Mexico. All of the Forestal Sanidad employees of CONAFOR are motivated, interested and have a desire to make this relatively new program a success in their region and nationally. The opportunity to work with such warm and friendly people was a very special experience for both Erik Johnson and me.

Submitted by: Tim McConnell, FHP, WO  
Erik Johnson, FHP, R-2

June 8, 2005